

Distributed Generation Solar in California

Framework for Policy and Regulatory Oversight in the Post-California Solar Initiative Era

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Introduction

California has a long history of forward-thinking policies and programs that demonstrate its commitment to a clean, sustainable energy future. The most significant of which is the Global Warming Solutions Act of 2006, generally referred to as AB 32 and considered landmark legislation that organizes state policy under the rubric of avoiding catastrophic global climate change. It requires that California reduce greenhouse gas (GHG) emissions to 1990 levels by 2020. The emission reduction mandates called for in AB 32 do not obviate earlier policy initiatives, but rather amplify them while providing an organizing framework for clean energy policy. In light of the ambitious goals set, we must ask, what does an AB 32-compliant California look like? How will we get there? What policies have we already put in place that can guide our path forward?

Achieving AB 32 goals will require a fundamental change in the way we generate and use energy in the state, driven in large part through massive new investments in energy efficiency, clean transportation and clean renewable generation. Fortunately, California is an innovator on all of these fronts, aggressively utilizing energy efficiency through standards and incentives, spearheading electric vehicle deployment and leading the nation in the development of

central station and distributed renewable generation. In this paper, we discuss the role of distributed generation (DG) solar in California's future energy portfolio; more specifically, the necessary policy and regulatory framework this sector will require as we approach the sunset of the California Solar Initiative (CSI) Program.

Distributed Generation vs. Central Station

Too often, the debate regarding near-term renewable energy policy turns to the question of whether we should focus on DG resources or rely more heavily on utility-owned or -controlled central station assets. This is a complex and nuanced question, and worthy of discussion, but these are not mutually exclusive choices. Generation in close proximity to customer load that leverages private capital has undeniable benefits from a public policy perspective. The expansion of high-efficiency central station generation located on underutilized lands near major transmission lines also has advantages. The fact is we need both, and any future portfolio of energy resources must include a diverse

mix of distributed and central station renewables. Given this reality, a more focused and appropriate question is how our programs and policies can support the expansion of central station generation while maintaining the continued expansion of customer-sited DG solar in the post-CSI era. And while we decline to state an upper limit on the amount of DG solar that should be part of the future mix, we note that the governor's 12 gigawatt (GW) proposal for renewable DG includes at least 3 GW of capacity that is not yet accounted for in any existing goals or programs.¹ At the very least, this suggests that there will be a need to facilitate DG solar beyond the CSI megawatt (MW) goals and well beyond the arbitrary net energy metering (NEM) cap in place, a point we will return to later.

Status of CSI and the Potential DG Solar Market

During the past six years, California has witnessed the emergence of a thriving solar market, based in large part on the success of its premier DG solar incentive program, the CSI Program. The CSI Program, established by the California Public Utilities Commission (CPUC) in 2006, was conceived as a 10-year market transformation program to provide monetary incentives to eligible solar photovoltaic (PV) systems from 2007 through 2016. In implementing the program, the CPUC established a goal for the general market portion of the CSI to install 1,750 MW of solar PV systems and an additional goal of 190 MW of solar PV systems for low-income residential and affordable housing

CSI Program Statistics

\$1.727 billion incentivized

1,544 megawatts installed

(7/10/2013)



¹ AN ENERGY POLICY ESSAY: Renewable and Distributed Power in California: *Simplifying the Regulatory Maze—Making the Path for the Future*, page 26. <http://media.hoover.org/sites/default/files/documents/energy-policy-tf-grueneich-study.pdf>



projects. After spending over \$1.727 billion incentivizing more than 1,544 MW,² the general market CSI Program has proven to be effective and is approaching attainment of its goals several years ahead of schedule.

Even with this tremendous success, a large potential market for DG solar will continue to exist once the program's monetary incentives are exhausted. There are more than 7.8 million single-family homes in California, suggesting that we have only just scraped the surface of this market. Moreover, 40 percent of the state's population lives in multitenant buildings, leaving a large, virtually untapped segment of the residential market for DG solar development. And, despite the CSI's achievements in accessing low-income markets, there remains considerable opportunity to increase access for these families. Furthermore, great opportunities remain in the commercial sector for DG solar.

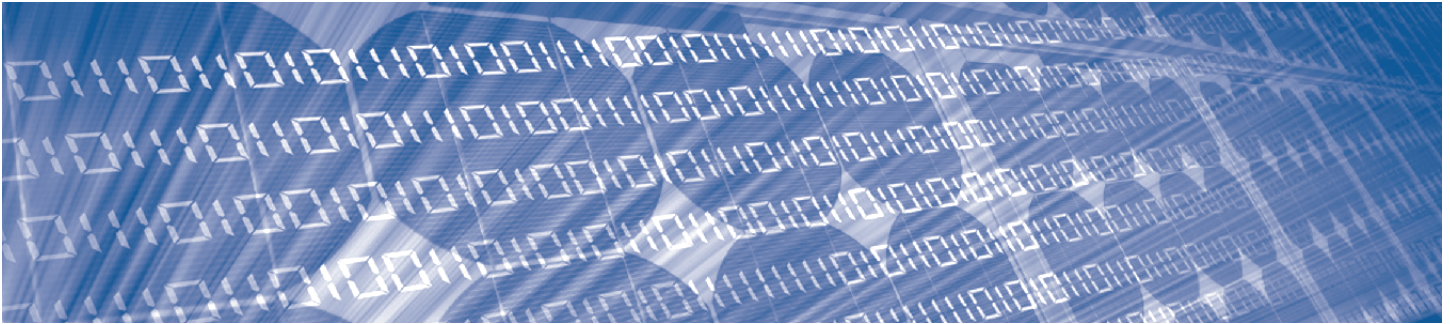
Nonincentive Benefits of CSI

While the support provided to industry by the CSI Program's monetary incentives are clear, the program's indirect, nonincentive benefits have been equally important to the success of California's DG solar market. The nonincentive benefits of the CSI Program are extensive and include consumer protection, transparency and availability of information and data, streamlined interconnection and permitting of DG solar systems and expanded access to DG solar. These nonincentive benefits have not only been crucial to the success of the program, but are equally, if not more important to the efficacy, sustainability and equity of any future DG solar market.

In light of the continued existence of a large potential market for DG solar and the importance of continued growth in this market to reach California's existing policy goals, it is time to consider a framework that will continue to provide the structure and functions of the CSI Program, even as the mainstream market incentives phase out. These nonincentive benefits should be provided on a consistent basis statewide, across the service territories of both the investor-owned utilities (IOUs) and the publicly owned utilities (POUs). This is critical as most DG solar installers/providers work across utility boundaries and because consumers need both local conditions and statewide context to receive transparent and consistent data and information.

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² As of July 10, 2013. <http://www.californiasolarstatistics.ca.gov/>



In this paper, we categorize and describe the nonincentive benefits of the CSI Program, including: (1) consumer protection, (2) information/data transparency and availability, (3) streamlined interconnection/permitting and (4) universal access. We provide rationale for why these functions should be continued, as well as suggest potential methods for continuing them, even after CSI installed capacity goals are met.

Consumer Protection

A central component of California's success in creating a vibrant solar market is the consumer protection service provided by the CSI Program. In particular, market participants benefit from price transparency and fraud protection provided by the program, as well as contract review by the CSI Program Administrators. As the CSI Program draws to a close, we will need to continue these aspects of consumer protection in order to sustain the trust in the solar market built by the program.

For instance, consumers will continue to require an easy way to compare installed system prices within their local regions and across the state. The CSI Program presently funds and supports California Solar Statistics (CSS),³ an online database providing consumers with the ability to compare DG solar contractors and their average cost per watt for system installations. This type of tracking and reporting should continue beyond the program, to ensure consumers have access to price transparency.

In addition, we must ensure that all DG solar systems installed meet the safety and performance requirements

of a nationally recognized standard and that appropriately licensed contractors install the systems. Presently, to be eligible for incentives under the CSI Program, all solar PV system components, including modules, inverters and system performance meters, must be certified through the California Energy Commission's (CEC's) PV system certification program. The CEC posts and maintains the current Eligible Equipment List on the *Go Solar California!* website,⁴ periodically adding and removing equipment. As with CSS, the Eligible Equipment List should continue to be maintained with oversight to ensure all DG solar systems installed in the state meet proper safety and performance requirements. Similarly, all solar PV system contractors must be licensed in accordance with rules and regulations adopted by the California Contractors State Licensing Board (CSLB) to be eligible for incentives under the CSI Program. The CSLB requirements in place also should be maintained and monitored by any post-CSI administrators, although this function could be centralized across the state. Such oversight should additionally include installer training for system quality, cost-effectiveness and code compliance.

We suggest that the most promising way to maintain the valuable consumer protection aspects of the CSI Program is through preservation of the *Go Solar California!* brand after the CSI Program sunsets. The *Go Solar California!* campaign is a joint endeavor of the CEC and CPUC, with the *Go Solar California!* website providing consumers a "one-stop shop" for information on solar programs, incentives and tax credits, as well as installation and interconnection. Notably, the *Go Solar California!* website has information on CSI Program rules, including eligible equipment and

³ <http://www.californiasolarstatistics.ca.gov/>

⁴ <http://www.gosolarcalifornia.ca.gov/equipment/>

standards, as well as information on how to find an eligible, licensed solar contractor. Moreover, the *Go Solar California!* brand encompasses statewide marketing, education and outreach; homeowner workshops and online training; and the provision of accurate information regarding system sizing and “right-sizing” of systems, thus providing an excellent channel through which to continue to provide the consumer protection aspects of the CSI Program. The key is to continue providing this brand as a general statewide resource and not allow it to be balkanized or limited only to individual IOU territories.

Information/Data Transparency and Availability

Along with consumer protection, the information/data transparency and availability afforded by the CSI Program have been central to the creation of a successful solar market in California. Robust performance and installation data collected via the CSI Program and published on the California Solar Statistics (CSS) website⁵ have provided regulators, developers, installers, customers, researchers and policymakers with an incredible tool for innovation. The transparency and availability of installation data, as well as the oversight of this data presently provided by the CSI Program, must therefore be continued.

The CSS website has not been valuable just to California, but has provided an excellent model for other states as well. As Walker Wright, director of government affairs for SunRun, said in a recent article,⁶ “[the] database is like gold in terms of the information it provides to policymakers, the regulatory world and the finance community.” Also highlighting the value of the CSI Program data and its availability on the CSS website during a panel on residential/nonresidential data and information decision support initiatives at a California Energy Commission Staff Workshop, panelist Cassie Bowe, public policy and market development analyst at SunPower Corporation, noted that one of the main ways the CSS website is used is to analyze the effects of technology,

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California Solar Statistics Website Information

Months of data	33
Monthly average page visits	8,200
Total unique visitors	193,000

(7/10/2013)

financing and other business offerings on market share.⁷ Ms. Bowe pointed out that access to this information has helped the industry reach consumers more quickly and inexpensively than they would have otherwise.⁸ In addition, as Ms. Bowe noted, collecting and presenting the data on solar installations remains valuable even after the CSI Program ends⁹ and would provide tremendous support for California’s policy goals and investments in clean energy. Thus, a clear plan for the transition of the CSS website to an equally robust platform in a post-CSI market is essential to the success of DG solar in California.

Moreover, we see this robust platform in a post-CSI market expanding the data available. The CSS website presently provides performance and installation data covering the CPUC-regulated IOUs; however, the state’s POUs are another source of valuable data that will help to provide a more comprehensive view of the DG solar market. Thus, the post-CSI platform should cover both the CPUC-regulated IOUs and the POUs across the state in a consistent and uniform manner.

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7 California Energy Commission Docket No. 12-EBP-1, Comprehensive Energy Efficiency Program for Existing Buildings (AB 758 Program), Transcript from October 9, 2012 Staff Workshop on Comprehensive Energy Efficiency Program for Existing Buildings (AB 758) Scoping Report, pages 107-108.

8 Ibid., p. 109.

9 Ibid., p. 110.

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5 <http://www.californiasolarstatistics.ca.gov/>

6 “ENERGY: Sun ready to set on state solar subsidy in San Diego County,” Eric Wolff, *North County Times*, September 24, 2012.

Finally, robust data from the CSI Program has provided the basis for the development of important financing innovations, including solar-friendly home equity line of credit (HELOC) loans, HERO financing, power purchase agreements (PPAs), leases and solar loans. These financing innovations have enabled customers who might otherwise have been precluded from purchasing solar PV due to the high up-front capital investment. The transparency afforded by the CSS data is not only crucial to the development of innovative tools, but also to the willingness of financial institutions to take on the risk of using those tools. The more information financial institutions have with regard to the security of the installations, and therefore the viability of their investments, the stronger their participation will be.

Solar system performance data is another trove of information afforded policymakers and grid operators. Through measurement and evaluation (M&E) activities, industry participants and regulators have insight into aggregated solar system production that has validated solar load profiles and their impact on California's utility grid. However, this data has been collected after the fact for CSI M&E reporting and not in valuable real-time, 15-minute intervals. Any future support of solar through the *Go Solar California!* brand should take the collection of solar system performance data one step further by tying it to the utilities advanced metering infrastructure (AMI). Once this data is collected, the utility could use it to meet the peak load and reserve requirements of CPUC jurisdictional load serving entities.

Future policy should foster the installation of the communication devices that make it possible to tie solar performance data with the utilities' smart meter technology.

The CSI Program, for all of its benefits, missed the opportunity to tie solar system production data to AMI for purposes of resource adequacy and planning by failing to enact policy that brought these two critical components together. Future policy should foster the installation of the communication devices that make it possible to tie solar performance data with the utilities' smart meter technology. This plan should be aimed at retrofitting the hundreds of thousands of solar systems already installed in California, as well as all future solar systems installed on the customer's side of the meter. With this connection, the utilities could not only apply this valuable information to their resource planning but at the same time, they could provide this data back to the customer in an easily viewable format in real time, essentially providing performance monitoring and reporting to the customer, offering a significant value for participants.

There exists a compelling case for subsidizing the provision of this data for regulatory and policymaking purposes, as well as for the insight it gives to market actors. One potential way of doing this would be to buy down the cost of metering equipment and provide centralized administration and support of data collection. Possible funding sources for these subsidies could include ratepayer funds, Proposition 39 funding or greenhouse gas (GHG) auction revenues, as well as the state budget, while recognizing the constraints currently placed on such funds. In general, user fees for the data to discourage abuse may be appropriate, but should be kept to a minimum and not allowed to inhibit access in any way.

Streamlined Interconnection and Permitting

With the tremendous success of the CSI Program, it became necessary to streamline interconnection and permitting procedures to accommodate greatly increased DG solar system installations in the state. While the CSI Program has enabled greater streamlined interconnection procedures and permitting, more remains to be done to meet the state's renewable distributed generation goals.



The system interconnection requirements for solar PV systems must be in accordance with the local electric utility rules for customer-generating facility interconnections, and to interconnect a solar PV system to the utility distribution system, certain documents, including but not limited to an Application to Interconnect a Generating Facility and a Generating Facility Interconnection Agreement or Net Energy Metering Agreement, must be executed with the local electric utility. The utilities are the appropriate guardians of the actual interconnection of generation equipment to the electricity grid, and this should continue in any future regime. Nevertheless, interconnection procedures, even in that context, can be streamlined and made consistent across the utility service territories without sacrificing any of the oversight and accountability of the utilities.

Along with streamlined interconnection, streamlined permitting is also a goal of the CSI Program and should remain a priority in a post-CSI DG solar market. Overly complex, confusing, expensive and inconsistent permitting processes can sour customers and installers alike, inhibiting greater adoption of DG solar technology. Streamlining permitting statewide will require extensive work with local jurisdictions, but with a perspective that goes beyond any one utility service territory. These efforts will require time and persistence, so sustained support at the statewide level is a necessary element.

An excellent framework for these efforts is provided by the Department of Energy (DOE) SunShot Initiative Rooftop Solar Challenge. SunShot is a collaborative national effort to make solar energy cost competitive with other forms of energy by the end of the decade, with the vision that reducing the installed cost of solar energy systems

by about 75 percent will drive widespread, large-scale adoption.¹⁰ The DOE indicates that nonhardware, or “soft,” costs associated with processes such as permitting and interconnection make up as much as 40 percent of the total installed cost of a rooftop solar PV system.¹¹ Specifically, the Rooftop Solar Challenge engages collaborative teams of local and state governments along with utilities, installers, nongovernmental organizations and others to work to reduce administrative barriers to residential and small commercial PV solar installations by streamlining, standardizing and digitizing administrative processes.¹² Central to this goal is developing and implementing a transparent, consistent and expedient permitting and interconnection process for all participating jurisdictions.¹³ These efforts should be continued and built upon. In addition, many models exist in other states that might work for California, such as New York State Energy Research and Development Authority (NYSERDA), Energy Trust of Oregon and Vermont Energy Investment Corporation (VEIC), and now is the perfect time to have a discussion as to which of these models might work for our state.

Moreover, widespread deployment of DG technologies will require distribution system upgrades that may be best handled at the local level, but must be considered in the context of the larger system. A consistent system-planning rule that is more sophisticated than our current 15 percent peak line loading rule would help to maximize cost-effective investments in clean energy. This would be most effective if applied uniformly across the state.

10 <http://www1.eere.energy.gov/solar/sunshot/>

11 <http://www.eere.energy.gov/solarchallenge/>

12 <http://www.eere.energy.gov/solarchallenge/>

13 <http://www.eere.energy.gov/solarchallenge/>

Expanded Access

One of the hallmarks of the CSI Program is that it has provided guaranteed interconnection and a fairly consistent value proposition to all eligible systems and customers. By asserting net energy metering (NEM) eligibility for qualified systems and providing a relatively clear, if not efficient, interconnection process, the CSI Program has made solar accessible for many single-family homeowners across the state. In addition, the CSI Program's Multifamily Affordable Solar Housing (MASH) and Single-family Affordable Solar Housing (SASH) Programs have provided access to the solar PV market directly to low- and moderate-income families for whom the primary barrier to adoption is high up-front costs and lack of access to capital, while overall, the CSI Program has facilitated financing innovations for all participants. Finally, important rate innovations, such as virtual net energy metering (VNEM), have created possibilities for community solar and installations at large multitenant buildings, both residential and commercial, which further expand the offering. These three aspects of the CSI Program demonstrate that all Californians can have access to a clean energy future, regardless of income or housing type, and these aspects should continue even as general market incentives phase out.

Solar Value Proposition

Given the nature of solar PV, where the consumer is buying energy forward by 20-25 years and where the intermittent but predictable generation is not always matched perfectly with on-site load, NEM is an elegant solution to the long-term value proposition of DG solar for both participating and nonparticipating ratepayers. We do not assert a particular model, although we suggest a compromise between the solar industry and the utilities is possible. Assuming that a reasonable solution can be worked out for all customers, solar or not, to pay a fair share of maintaining the transmission and distribution grid and that the NEM cap is appropriately expanded or lifted completely, access to solar-friendly NEM rates or some equivalent should continue in any post-CSI regime.

Access for Low-income Populations

Similarly, solar will always be a capital-intensive proposition, and thus financing options and support for low-income customers are an essential part of ensuring the equity of the market in the future as well as the ability to respond to changing macroeconomic conditions. Low-income support can be in the form of incentives and subsidies or in the form of workforce training, technical assistance, loan guarantees or other functions. The MASH and SASH programs already provide a good model with very limited cost exposure to ratepayers but a tremendous boost to the targeted communities. Currently, Assembly Bill (AB) 217 proposes a continuation of those programs post-CSI, and we generally support this approach.

Community Solar

Finally, we come to the issue of access for the huge numbers of Californians who live in multitenant buildings or in houses unsuited for solar (i.e., because of shading, rooftop configuration, orientation, etc.). Small businesses may face many of these same issues as well. To some degree, VNEM offers a solution to renters and condominium dwellers. Green tariffs, such as those currently proposed by San Diego Gas & Electric Company (SDG&E) and Southern California Edison Company (SCE), where a customer can voluntarily pay a premium to consume solar electricity, provide a possible answer for customers who cannot directly install DG solar but want to participate anyway. Shared, or "community," solar offers another opportunity to target in-basin generation while simultaneously helping under-served or distressed populations. As envisioned here, such a program would target local resources, as opposed to central station, but the principles are the same. Pioneered in cities like Davis, California, and continued in the Sacramento Municipal Utility District (SMUD) Solar Shares program and now in the "solar gardens" of Colorado, community solar can facilitate construction of rooftop or ground-mount solar arrays that can then benefit the surrounding community. There are currently many worthy legislative and policy proposals circulating for the structure of a community

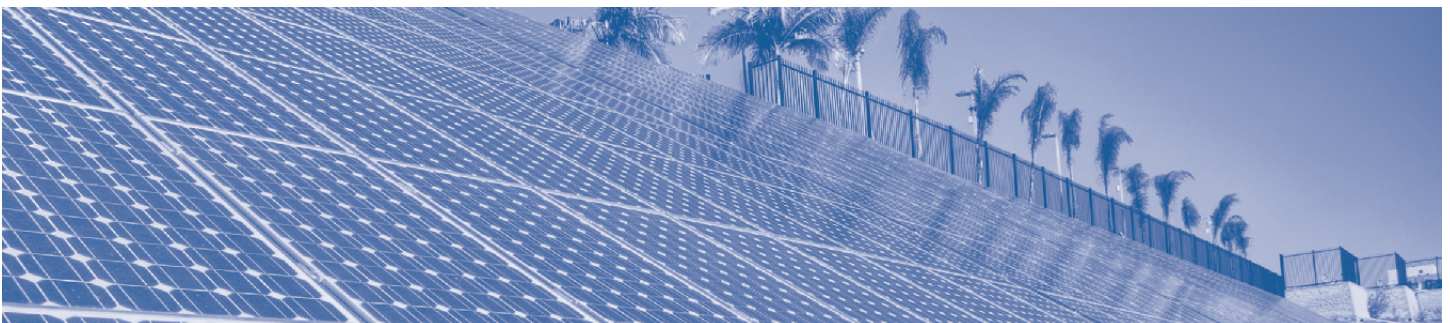
solar program. The principle that we assert here is that whatever the exact form, such a program should provide the same value proposition to participants that an individual homeowner receives under the post-CSI regime and that all of the other conditions we suggest above hold true. Specifically, customers should be provided an opportunity to both invest in solar PV for its environmental benefits and at the same time benefit economically from that investment if possible. We assert that community solar proposals based solely on a price premium are in fact green pricing programs and will not see the participation and customer benefit of their DG counterparts.

Conclusion

The CSI Program has provided many benefits beyond the actual monetary incentives, and these nonincentive benefits are essential elements of a successful DG solar market. As the CSI Program draws to a close and the CPUC and state policymakers consider next steps, focus should be on efficient ways to provide these elements on a consistent, statewide basis. Although direct incentives to the general market will no longer need to be a feature, some level of funding and top-down organization will help to rationalize the market. Sources for this funding may include ratepayer funds, such as Electric Program Investment Charge (EPIC) funds; taxpayer funds; greenhouse gas (GHG) auction revenues; Proposition 39 expenditures; and perhaps some minimal or nominal user fees for the services provided. A robust, centrally administered statewide program to facilitate DG solar installations is the most efficient way to deliver these services and to make the most of available DG resources

in California. By leveraging existing infrastructure and practices, this can be achieved without compromising local and regional expectations.

Without a strong statewide effort, disconnected and inconsistent processes and efforts will almost certainly result in a degraded market for DG solar and will therefore undermine achieving our GHG emission reduction goals. The CPUC, CEC and state legislature all have an interest in supporting AB 32, and we encourage them to work with the IOUs and POUs to develop an appropriate framework for the post-CSI world.



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